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**BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES**

Paper No. 22

Application Number: 09/806,220
Filing Date: May 14, 2001
Appellant(s): SANDSTROM, ROGER

MAILED

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GROUP 3600

Mark P. Stone
For Appellant

EXAMINER'S ANSWER

This is in response to the appeal brief filed 16 January 2004.

(1) *Real Party in Interest*

A statement identifying the real party in interest is contained in the brief.

(2) *Related Appeals and Interferences*

A statement identifying the related appeals and interferences which will directly affect or be directly affected by or have a bearing on the decision in the pending appeal is contained in the brief.

(3) *Status of Claims*

The statement of the status of the claims contained in the brief is correct.

(4) *Status of Amendments After Final*

The appellant's statement of the status of amendments after final rejection contained in the brief is correct.

(5) *Summary of Invention*

The summary of invention contained in the brief is correct.

(6) *Issues*

The appellant's statement of the issues in the brief is correct.

(7) *Grouping of Claims*

The rejection of claims 1-4 stand or fall together because appellant's brief does not include a statement that this grouping of claims does not stand or fall together and reasons in support thereof. See 37 CFR 1.192(c)(7).

(8) *Claims Appealed*

The copy of the appealed claims contained in the Appendix to the brief is correct.

(9) *Prior Art of Record*

DE 1170887	Manten	5-1964
4,760,887	Jannson et a l.	08-1988
6,196,598	Yao	03-2001

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(10) Grounds of Rejection

The following ground(s) of rejection are applicable to the appealed claims:

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claim 1 is rejected under 35 U.S.C. 103(a) as being unpatentable over DE 1170887 in view of Jansson et al. (US 4,760,887).

DE 1170887 discloses a threaded connector for a percussion drilling assembly.

The connector includes the following features:

- A male thread (3a and 3b) located on a first drill string element (3).
- A female thread located on a second drill string element (1 and 2).
- The first and second drill string elements each include respective impact surfaces (shown in the Figure) that are arranged to abut each other.

DE 1170887 discloses all of the limitations of the above claims except for the threads being characterized in that they have a crest having a radius of curvature that is greater than 30% of the pitch of the threads.

In column 2, lines 10-20 and column 3, lines 25-43, Jansson et al. teaches a threaded connector for a percussion drilling assembly with threads are characterized in that they have crests having a radius of curvature that is greater than 30% of the pitch of the threads; specifically 43.3%.

It would have been considered obvious to one of ordinary skill in the art, at the time the invention was made, to have formed the threads of DE 1170887 so that they are characterized in that they had crests having a radius of curvature that was greater than 30% of the pitch of the threads as taught by Jansson et al. in order to have achieved a

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threaded coupling that has a long life span and good unscrewing characteristics (see col. 3, lines 17-19).

Further, it would have been considered obvious to one of ordinary skill in the art, at the time the invention was made, to have formed the threads of DE 1170887 so that they are characterized in that they had crests having a radius of curvature that was greater than 30% of the pitch of the threads, since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. *In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).

Claims 2-4 are rejected under 35 U.S.C. 103(a) as being unpatentable over DE 1170887 in view of Jansson et al. (US 4,760,887) as applied to claim 1 above, and further in view of Yao (US 6,196,598).

DE 1170887 and Jansson et al. disclose all of the limitations of the above claims except for the angle of the cone formed by the male and female threads being less than 20°, specifically 3°.

Yao teaches a threaded coupling for a drill string used in rotary or percussive drilling. The threads of the coupling are conical in shape and have a cone angle of between 3° and 10°. (See col. 4, lines 13-29)

It would have been considered obvious to one of ordinary skill in the art, at the time the invention was made, to have formed the cone formed by the male and female threads of DE 1170887 in view of Jansson et al. with an angle less than 20°, specifically 3° as taught by Yao in order to have ensured optimum stress mitigation (see col. 4, lines 25-29)

To reduce the issues on appeal, the examiner has withdrawn the following rejections:

- Claim 1 is rejected under 35 U.S.C. 103(a) as being unpatentable over Jansson et al. (US 4,760,887) in view of Saunders et al. (US 4,549,754) and Puttmann (US 5,924,500).
- Claims 2-4 are rejected under 35 U.S.C. 103(a) as being unpatentable over Jansson et al. (US 4,760,887) in view of Saunders et al. (US 4,549,754) and

Puttmann (US 5,924,500) as applied to claim 1 above, and further in view of Yao (US 6,196,598).

- Claim 1 is rejected under 35 U.S.C. 103(a) as being unpatentable over Jansson et al. (US 4,760,887) in view of Saunders et al. (US 4,549,754), Puttmann (US 5,924,500), and Eklof et al. (US 4,687,368).
- Claims 2-4 are rejected under 35 U.S.C. 103(a) as being unpatentable over Jansson et al. (US 4,760,887) in view of Saunders et al. (US 4,549,754), Puttmann (US 5,924,500), and Eklof et al. (US 4,687,368) as applied to claim 1 above, and further in view of Yao (US 6,196,598).
- Claim 1 is rejected under 35 U.S.C. 103(a) as being unpatentable over Larsson (US 4,861,209) in view of Saunders et al. (US 4,549,754) and Puttmann (US 5,924,500).
- Claims 2-4 are rejected under 35 U.S.C. 103(a) as being unpatentable over Larsson (US 4,861,209) in view of Saunders et al. (US 4,549,754) and Puttmann (US 5,924,500) as applied to claim 1 above, and further in view of Yao (US 6,196,598).

The examiner's rejection is based on the following findings:

Findings

Claim 1:

- 1) DE 1170887 discloses a threaded coupling (Figure) for a drill string for percussive rock drilling (see page 1, lines 1 and 2 of the first paragraph of the translation).
- 2) The threaded coupling of DE 1170887 includes a male thread **3a, 3b**.
- 3) The threaded coupling of DE 1170887 includes a female thread (located on drill tubes **1 and 2**).
- 4) As seen in the Figure of DE 1170887, the male thread **3a, 3b** cooperates with the female thread (located on drill tubes **1 and 2**).
- 5) The male thread of DE 1170887 is arranged on a first drill string element **3**.

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- 6) The female thread of DE 1170887 is arranged on a second drill string element **1 and 2**.
- 7) The first drill string element of DE 1170887 includes a first impact surface (Figure).
- 8) The second drill string element of DE 1170887 includes a second impact surface (Figure).
- 9) As seen in the Figure of DE 1170887, the first and second impact surfaces are arranged to abut against each other.
- 10) The male and female threads of DE 1170887 are conical (see page 2, lines 2-4 of the seventh paragraph and claim 1).

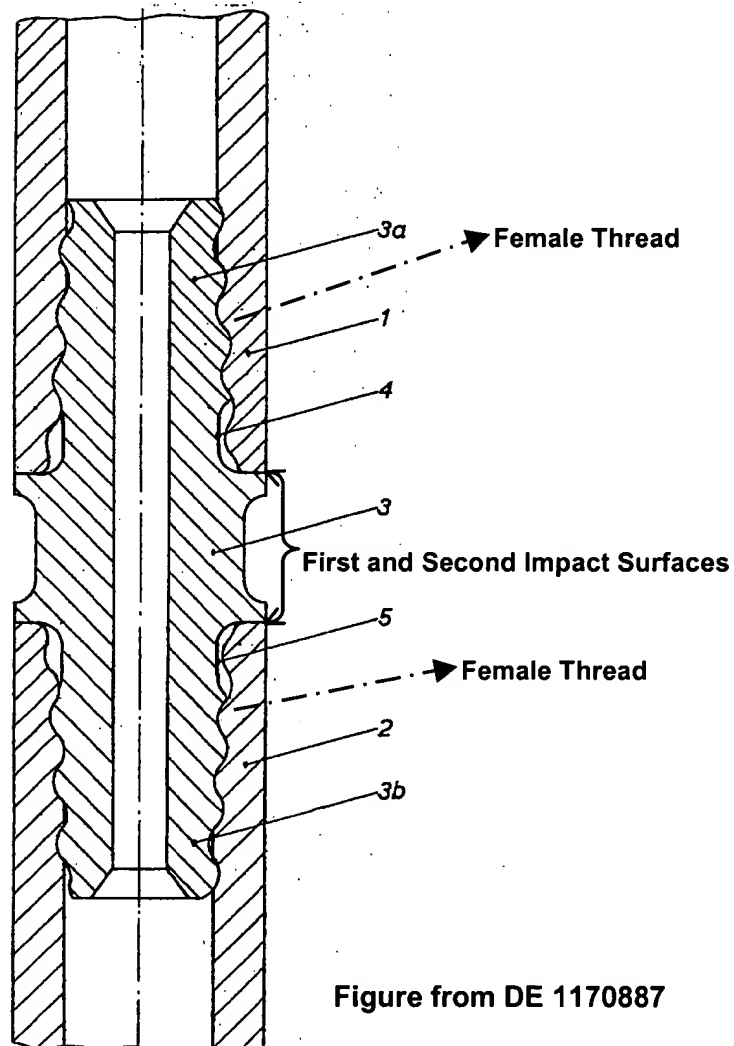


Figure from DE 1170887

- 11) Jansson et al. discloses a threaded coupling (Figure 1) for a drill string for percussive rock drilling (see column 1, lines 12-19).
- 12) The threaded coupling of Jansson et al. includes a male thread **13, 14**.
- 13) The threaded coupling of Jansson et al. includes a female thread (the threads of element **12**).
- 14) As seen in Figure 1 of Jansson et al., the male thread **13, 14** cooperates with the female thread (the threads of element **12**).
- 15) The male thread of Jansson et al. is arranged on a first drill string element **10, 11**.
- 16) The female thread of Jansson et al. is arranged on a second drill string element **12**.
- 17) The crest of the male thread of Jansson et al. has a radius of curvature that is larger than 30% of the pitch of the thread (see column 2, lines 10-20 and column 3, lines 25-43).

DE 1170887 discloses all of the elements of claim 1 as set forth in findings 1-10 except for the crests of the male threads having a radius of curvature that is larger than 30% of the pitch of the thread. Jansson et al. teaches a threaded coupling for percussive drilling where the male threads have a crest with a radius of curvature that is larger than 30% of the pitch of the thread as set forth in findings 11-17. In view of the findings, It would have been considered obvious to one of ordinary skill in the art, at the time the invention was made, to have modified DE 1170887 such that the crests of the male threads having a radius of curvature that is larger than 30% of the pitch of the thread as taught by Jansson et al.

Claims 2-4

- 18) Yao discloses a threaded coupling (Figure 2) for a drill string **10** for percussive or rotary drilling (see column 1, lines 4-10).
- 19) The threaded coupling of Yao includes a male thread **16, 18**.
- 20) The threaded coupling of Yao includes a female thread **20, 22**.
- 21) As seen in Figure 2 of Yao, the male thread **16, 18** cooperates with the female thread **20, 22**.
- 22) The male thread of Yao is located on a first drill string element **12**.
- 23) The female thread of Yao is located on a second drill string element **14**.
- 24) The male and female threads of Yao are conical (Figure 2).

25) The angle of the cone defined by the male and female thread of Yao is less than 20° (claim 2), between 2° and 5° (claim 3), and 3° (claim 4) (see col. 4, lines 13-29).

DE 1170887 and Jansson et al. disclose all of the elements of claims 2-4 as set forth in findings 1-17 except for the angle of the cone defined by the male and female thread Yao is less than 20° (claim 2), between 2° and 5° (claim 3), and 3° (claim 4). Yao teaches a threaded coupling for percussive or rotary drilling where the angle of the cone defined by male and female thread is between 3° and 10° as set forth in findings 18-25. In view of the findings, it would have been considered obvious to one of ordinary skill in the art, at the time the invention was made, to have modified the threaded coupling of DE 1170887 and Jansson et al. such that angle of the cone defined by the male and female thread is less than 20° (claim 2), between 2° and 5° (claim 3), and 3° (claim 4) as taught by Yao.

(11) Response to Argument

In response to applicant's argument that DE 1170887 and Jansson et al. cannot be combine because DE 1170887 discloses conical threads and Jansson et al. discloses cylindrical threads, the test for obviousness is not whether the features of a secondary reference may be bodily incorporated into the structure of the primary reference; nor is it that the claimed invention must be expressly suggested in any one or all of the references. Rather, the test is what the combined teachings of the references would have suggested to those of ordinary skill in the art. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981). The examiner notes that applicant is arguing the references individually when they have been applied under 35 USC 103 thus must be argued as combined. Jansson et al. was used merely to teach the crests of the male threads having a radius of curvature that is larger than 30% of the pitch of the thread thus the taper of the threads of Jansson et al. are not relevant.

In response to applicant's argument that the examiner's conclusion of obviousness is based upon improper hindsight reasoning, it must be recognized that any judgment on obviousness is in a sense necessarily a reconstruction based upon hindsight reasoning. But so long as it takes into account only knowledge which was within the level of ordinary skill at the


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time the claimed invention was made, and does not include knowledge gleaned only from the applicant's disclosure, such a reconstruction is proper. See *In re McLaughlin*, 443 F.2d 1392, 170 USPQ 209 (CCPA 1971). The examiner notes that she has not relied upon applicant's teachings as bases for the above obviousness rejection but has provided motivation from the secondary reference; column 3, lines 17-19 of Jansson et al. and column 4, lines 13-29 of Yao.

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

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Art Unit 3672

JHG 
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